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ABSTRACT

The incremental validity of two high-inference, multiple-dimension measures of student and teacher perceptions of their school environment was investigated. Incremental validity was described as accounting for increasing amounts of criterion variance (average daily attendance and achievement on the Iowa Tests of Basic Skills) with a set of independent variables, using multiple regression analysis. The two instruments--the School Survey and My School Inventory--were administered to 1,018 elementary school teachers and 6,151 fourth grade students, respectively. Teacher perceptions of the school's educational effectiveness were strongly correlated with achievement. Positive teacher perceptions of special services programs, relationship with the principal, and relationships with colleagues were also associated with variance in achievement. Teacher perceptions of school effectiveness were also highly correlated with average daily attendance. Student perceptions of school academic difficulty were strongly and negatively correlated with achievement. Attendance was correlated with students' positive perception of cohesiveness among peers. Although both tests appeared to have incremental validity, for the achievement criterion; validity was higher with the School Survey, which was used to measure teacher attitudes. This finding is of considerable importance because previous studies with similar paradigms have focused on student attitudes. (GDC)

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THE INCREMENTAL VALIDITY OF TEACHER AND STUDENT PERCEPTIONS OF SCHOOL ENVIRONMENT CHARACTERISTICS

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INTRODUCTION

During the past fifteen to twenty years, several research groups have initiated basic research programs to identify important characteristics of the school climate/learning environment and to develop high inference measures of these. Bloom (1964) has emphasized the importance of developing such measures as crucial for the adequate control, prediction, and manipulation of learning outcomes.

According to Anderson (1973), the recent development and validation of school climate measures began in conjunction with the early 1960's evaluation of Harvard Project Physics. Using as a format the studies of Hemphill and Westie (1950) and Getzels' and Thelen's (1960) theoretical model of the class as a social system, Walberg and Anderson developed the Learning Environment Inventory (LEI). Among the several instruments recently developed to measure student perceptions of the school environment the LEI has been the most widely utilized in educational research. Reviews of research with the LEI (Anderson and Walbert, 1974; Insell and Moos, 1974; Moos, 1973; Randhawa and Fu, 1973; Walberg, 1976) demonstrate that student perceptions of the social environment of their classes account for substantial variance in cognitive, affective, and behavioral learning criterion measures beyond that accounted for by beginning course grades, mental abilities, or both. These findings have been recently replicated in other cultures (Walberg, Singh, & Rasher, 1977).

Using partial canonical correlation techniques, Perkins (1976) found that elementary student perceptions of the school environment significantly correlated with a school outcome variate of achievement and attendance when teacher attitude variance was removed from these relations. Licata, Willower, and Ellett (1977), using a large sample of secondary students, established

significant multiple correlations between the perceptions of goal direction, cohesiveness, lack of competitiveness, and diversity, and a "robustness" semantic differential applied to the concept My School. Additionally, Ellett, Payne, Masters, & Pool (1977) established significant correlations between the elementary student perception of academic difficulty and achievement (r=-.65) and academic difficulty and attendance (r=-.55).

While much has been completed in developing measures of student perceptions of school climate/learning environment characteristics, comparatively little has been accomplished in developing similar measures for teachers. The most widely used high inference instrument for assessing teacher attitudes toward the educational context has probably been the Minnesota Teacher Attitude Inventory (MTAI). Earlier research with the MTAI (Cook, Leeds, & Callis, 1951) indicated that attitudes toward children and school work are significantly correlated with teacher-pupil relations found in teachers' classrooms. Several investigations (Kerlinger and Pedhazur, 1968; Lindgren and Singer, 1963; McGee, 1955; Sontag, 1968) report close relationships between teachers' authoritarian or democratic, traditional or progressive attitudes and actual or perceived teacher classroom behavior related to students. It might be noted, however, that subsequent studies have failed to replicate these findings with the MTAI and have questioned its ability to predict teacher-student relations.

More recently (1974), Coughlan and Cooke described the development of a multiple dimension high inference measure of teacher job satisfaction or work "morale" called the School Survey (SS). Initial research with the SS in the Chicago public schools showed that teachers in schools with the greatest achievement gains perceived their schools as being more educationally effective, having more constructive supervisory relations with the principal, closer community contact, and allowing a greater voice in the educational program than did teachers in schools with the lowest achievement gains (Coughlan and Cooke, 1974). Subsequent research on the SS has questioned its factor

structure (Ellett and Masters, 1977) and demonstrated significant, moderate third-order partial correlations between teacher percpetions of their work environment and student achievement when school attendance, SES, and school size are statistically controlled (Ellett et al., 1977).

Additionally, studies by Pool (1976) and Pool and Ellett (1977) have demonstrated strong canonical correlation relationships between teachers' ratings of principals' competencies and teacher school context perceptions using the SS. A recent investigation by Ellett and Licata (1978) reports significant multiple correlations between selected factors of the SS and a semantic differential measure of school environmental "robustness" applied to three concepts: 1) My Role as a Teacher, 2) My Principal, and 3) My Students. When combined with results of several other investigations, these findings demonstrate that teacher perceptions of dimensions of their working environment can be measured reliably (Perkins, 1976; Pool, 1976) and have criterion-related and discriminant validity (Coughlan and Cooke, 1974).

With the recent nationwide achievement test score decline, a reemphasis on basic skills (Harnischfeger and Wiley, 1976) and a movement toward competency-based education models for students (Spady and Mitchell, 1977; Spady, 1977) has been suggested. Alternatives to academic achievement have also been posited as legitimate educational outcomes for students: socialization through the school years (Wynne, 1972); the enhancement of intelligence (Lohnes, 1973); humanistic education (Combs, 1973); attitudes toward the quality of school life (Epstein and McPartland, 1976); self-responsibility for managing school learning (Wang and Stiles, 1976); and academic self-concept development (Bloom, 1977). Whatever the expressed alternative goals however, researchers have generally attempted to establish relationships between measures of these and academic success in the traditional sense (e.g., relationships between attitudes , self-concept, and achievement).

Purpose

The purpose of this investigation was to establish the incremental validity of high inference, multiple dimension measures of student and teacher perceptions of the school environment. The concept of "incremental" validity as used here refers to accounting for increasing amounts of criterion variance with a set of independent variables using multiple regression procedures. Owing to past research findings with measures of student and teacher school environment perceptions, it was hypothesized that the instruments investigated would demonstrate adequate incremental validity using student achievement and school attendance as criterion variables in the analyses. In addition, it was predicted that teacher perceptions of school educational effectiveness and student perceptions of the lack of academic difficulty (school easiness) would relate more strongly to the achievement criterion than other teacher and student perceptions. No specific hypotheses were developed for the school attendance criterion and the perception measures.

METHOD

Sample

Samples for the study consisted of 6,151 fourth-grade students (approximately 50% male; 50% female) in 89 elementary schools, and 1,018 teachers in 41 elementary schools in the state of Georgia.

Instrumentation

Teachers in the study were administered the School Survey (SS), a 118-item, 14-subscale instrument originally designed as a measure of teacher work satisfaction or "morale" (Coughlan and Cooke, 1974). The SS yields scores for teacher perceptions of the following dimensions: Administrative Practices, Professional Work Load, Non-professional Work Load, Materials and Equipment, Buildings and Facilities, Educational Effectiveness, Evaluation of Students,

Special Services, School-Community Relations, Supervisory Relations, Colleague Relations, Voice in Educational Program, Performance and Development, and Financial Incentives. The response format for the SS allows teachers to state whether they Agree, are Neutral, or Disagree with each of the 118 items. The SS requires approximately 45 minutes to complete.

Elementary students in the study were administered the My School (MS) inventory, an adaptation of Walberg and Anderson's (1973) My Class Inventory (MCI). The original MCI was adapted from the Learning Environment Inventory (LEI) for secondary students by Walberg and Anderson (Anderson, 1973). The MS inventory was developed from the MCI by simply changing the word "class" to "school" in each instrument item. The MS inventory measures elementary student perceptions of the following school climate characteristics: Satisfaction, Friction, Competitiveness, Difficulty, and Cohesiveness. The instrument contains 45 items evenly distributed over the five subscales and requires approximately 30 to 45 minutes to complete.

Criterion Measures

Achievement: The measure of student achievement was the Battery Total raw score of the Iowa Test of Basic Skills (ITBS) made available through the Georgia Statewide Testing Program for each participating school.

Attendance: Average Daily Attendance (ADA) figures, (expressed as a percentage of the maximum possible attendance), were derived for each school from the most recent twenty-day period coinciding with the time of instrument administration.

Data Collection Procedures

Data for the study were collected during 1974-1976 as part of a larger research project aimed at validating measures of principal competencies. The School Survey was administered to all teachers on a take-home basis allowing

from three to five days for completion. Teachers were not identified except in terms of school code, and were advised that their responses were contributed anonymously. Teacher groups within schools in the sample ranged in size from approximately 12 to 55. The My School inventory was administered to fourth-grade student groups ranging in size from approximately 50 to 250. The MS instrument items were administered orally to control for reading difficulty.

Statistical Analyses

Because teacher and student anonymity was assured, class means could not be used as the units of statistical analyses. Owing to the large number of participants and schools (and general assumptions about the stability of school means) school means were used as the units of statistical analysis.

Using procedures as outlined by Kim and Kohout (1975), school achievement and attendance variables were regressed on subscales of the teacher and student perception measures using forward, stepwise inclusion procedures. With such procedures, the independent variable that explains the greatest amount of criterion variance is entered into the regression equation first, and variables that explain the greatest amount of variance in conjunction with those already in the equation enter at each successive step. No hierarchial inclusion criteria were established for the entry of any of the independent variables. Four separate regression analyses were performed: achievement criterion with factors of the SS; attendance criterion with factors of the SS; achievement criterion with factors of the MS; and attendance criterion with factors of the MS.

RESULTS

Table 1 presents a summary of multiple and simple correlation coefficients for each regression step derived from regressing achievement and attendance variables on subscales of the School Survey instrument. For the ITBS/SS analysis

TABLE I

Summary of Stepwise Regression Multiple (R) and Simple (r) Correlations for Achievement and School Attendance Regressed on Factors of the School Survey (n=41 Elementary Schools)*

Achievement				Attendance			
Regression Step	Variable Entered	R	r	Regression Step	Variable Entered	R	r
1.	Educational Effectiveness	.79	.79	1.	Educational Effectiveness	.53	.53
2.	Special Services	.81	.58	2.	Special Services	.58	.10
3.	Supervisory Relations	.83	.25	3.	Non-Professional Work Load	.61	.37
4.	Colleague Relations	.85	.61	4.	School/Community Relations	.65	.21
5.	Voice in Educational Program	.85	.46	5.	Voice in Educational Program	.70	.34
6.	Non-Professional Work Load	.86	.59	6.	Performance and Development	.72	.17
7.	Professional Work Load	.86	.59	7.	Colleague Relations	.73	.29
8.	Performance and Development	.86	.46	8.	Evaluation of Students	.74	.49
9.	Evaluation of Students	.87	.73	9.	Buildings and Facilities	.75	.24
10.	Administrative Practices	.87	.58	10.	Materials and Equipment	.76	.13
11.	Buildings and Facilities	.87	.57	11.	Administrative Practices	.77	.33
12.	School/Community Relations	.87	.57				
13.	Materials and Equipment	.87	.39				

*School means used as the units of statistical analysis

(left side of Table 1), teacher perceptions of school Educational Effectiveness were strongly and positively correlated with school achievement (r=.79), and accounted for approximately 62% of achievement variance among schools in the sample. Approximately 2% additional variance in achievement was accounted for at steps 2, 3, and 4 by teachers' positive perceptions of school Special Services programs, Supervisory Relations provided by the principal, and general Colleague Relations. When combined with perceptions towards school Educational Effectiveness, these three additional positive teacher perceptions increased the ITBS/SS multiple correlation to .85, indicating approximately 72% ITBS/SS shared varinace. The addition of other teacher perceptions at steps 5 through 13 in the analysis added little to explained ITBS variance.

The right side of Table 1 summarizes the regression of school attendance on subscales of the School Survey. Again, the highest correlate of school attendance was teachers' positive perceptions of school Educational Effectiveness (r=.53), indicating approximately 28% variance commonality between this teacher perception dimension and school ADA. Meaningful amounts of school attendance variance were subsequently accounted for through step 6 by the addition of teachers' positive perceptions of school Special Services programs, Non-Professional Work Load, School-Community Relations, Voice in Educational Program, and opportunities for professional Performance and Development.

When examining both SS/Criterion Variable regressions, it is interesting to note that the teacher perception contributing most to explained ITBS and ADA variance was Educational Effectiveness. In addition, when combined with positive perceptions of school educational effectiveness, teachers' favorable perceptions of school Special Services programs entered at step number 2 in both analyses. For the ITBS/SS subscale simple correlations, it is interesting to note that all were statistically significant ($p<.01$), with the exception of Supervisory Relations. Comparing the simple SS/Criterion Variable simple correlations for the two analyses in Table 1, those for the ITBS/SS analysis were

generally larger in magnitude and more frequently occurring than those for the ADA/SS analysis.

Table 2 presents a summary of multiple and simple correlation coefficients for each regression step derived from regressing school achievement and attendance indices on factors of the My School (MS) inventory administered to elementary students. For the ITBS/MS analysis (left side of Table 2), student perceptions of school academic Difficulty were strongly and negatively correlated with school achievement (r=-.64), and accounted for approximately 41% of achievement variance among schools in the sample. When combined with student perceptions of lack of academic Difficulty ("easiness"), student perceptions of lack of Cohesiveness among peers (r=-.41) increased the multiple correlation to .79, and the amount of ITBS/MS shared variance (squared multiple correlation) to approximately 62%. The addition of student perceptions of low Friction (r=-.04), general dissatisfaction with school (r=-.30), and Competitiveness increased the multiple correlation to only .85 and the amount of shared ITBS/MS variance to approximately 75%.

For the ADA/MS analysis (right side of Table 2), the highest correlate (step 1) of school attendance was students' positive perception of Cohesiveness among peers (r=.29; p<.01). When combined with students' perceptions of lack of academic Difficulty ("easiness"), the multiple correlation increased to .35 indicating approximately 13% ADA/MS common variance. The addition of student perceptions of general school Satisfaction (r=.37), low Friction (r=-.27), and lack of Competitiveness (r=-.20) only increased the multiple correlation to .38, and the amount of shared ADA/MS variance to 14%.

When comparing the simple correlations for the two MS/Criterion variable analyses in Table 2, three of the five possible ITBS/MS subscale correlations were significant (p<.05), while all five of the possible ADA/MS subscale correlations were significant (p<.05). Part of this difference is attribu-

TABLE 2

Summary of Stepwise Regression Multiple (R) and Simple (r) Correlations for Achievement and School Attendance Regressed on Factors of the My School Inventory*

Achievement (n=41 Elementary Schools)				Attendance (n=89 Elementary Schools)			
Regression Step	Variable Entered	R	r	Regression Step	Variable Entered	R	r
1.	Difficulty	.64	-.64	1.	Cohesiveness	.29	.29
2.	Cohesiveness	.79	-.41	2.	Difficulty	.35	-.28
3.	Friction	.83	-.04	3.	Satisfaction	.37	.21
4.	Satisfaction	.85	-.30	4.	Friction	.38	-.27
5.	Competitiveness	.85	.08	5.	Competitiveness	.38	-.20

*School means used as the units of statistical analysis

table to sample size since the ADA/MS correlations were based on a much larger sample (n=89) than the ITBS/MS correlations (n=41). There was a tendency among the simple correlations, however, for greater magnitude between the ITBS/MS subscales than between the ADA/MS subscales. Considered collectively with the regression analysis results described above, the ITBS may represent a somewhat more predictable criterion measure for investigations of student school climate perceptions than school ADA, possibly owing to differences in criterion measure variability.

DISCUSSION AND CONCLUSIONS

The process of regressing school achievement and attendance indices on multiple dimension measures of teacher and student perceptions of school environment/climate characteristics supports the general hypothesized, incremental validity of such measures. When considering instruments used in this study, it appears that more commonality exists between teacher perceptions of the school environment and school achievement and attendance, than between these same criterion variables and student perceptions. The fact that teachers' positive perceptions of school Educational Effectiveness and student perceptions of school "easiness" (low Difficulty) were significantly correlated with school achievement supports the predictive hypotheses of the investigation, with the exception of the ADA/MS relationship. For this analysis, the highest single correlate of school attendance was students' positive perception of Cohesiveness among peers (r=.19), which makes intuitive sense when conceptualizing positive interpersonal relationships among students as a factor related to the "holding power" of the elementary school.

The finding that the SS subscales demonstrated greater incremental validity for the achievement criterion than the MS subscales is a finding of considerable importance. Many past research studies have demonstrated the validity of stu-

dent measures of school climate characteristics, both from the "true" predictive and criterion-related validity paradigms. These studies generally yield results supporting the fact that student perceptions of the school environment account for substantial amounts of achievement variance. Few investigations can be found where similar paradigms have been tested utilizing teacher school environment perception measures such as the School Survey. While the MS and the SS instruments cannot be directly compared in terms of content, data reported here support teacher school environment perceptions as a potent factor mediating the school environment.

It may be that such teacher perceptions serve to mediate between teacher-student interactions and subsequent student learning. Though a causal model can not be structured from the analyses reported here, it might be hypothesized that teacher perceptions act as percursors to subsequent teacher classroom behavior which, when enacted, impacts on critical student perceptions and subsequent student behavior. The general school environment is a "highly interactive" system, and such causal models are not easily investigated. However, the results of this study suggest that teacher attitudes towards multiple dimensions of their working environment are potent sources for future investigations.

A direct interpretation of the SS/ITBS multiple correlations indicates that a combination of teachers' positive perceptions of school Educational Effectiveness, Special Services, Supervisory Relations, and Colleague Relations has much in common with higher achieving schools. This finding, though derived from a different statistical procedure, is similar to findings reported by Coughlan and Cooke (1973) for Chicago schools. For the SS/ADA multiple correlations, a somewhat different combination of positive teacher perceptions (Educational Effectiveness, Special Services, Non-Professional Work Load, School-Community Relations, Voice in Educational Program, and op-

portunities for professional Performance and Development) is found in schools with greater average daily attendance.

For the ITBS/MS analysis, a considerable amount (62%) of achievement variance was accounted for by elementary students' perceptions of lack of academic difficulty and lack of cohesiveness among peers. This finding may have implications for elementary school curriculum planners when considering student perceptions of school learning tasks. It appears that higher achievement at the elementary school level is fostered by students' perceptions of the general school curriculum as relatively more "easy" than difficult. This finding is of interest since the relationship between student achievement and difficulty has been demonstrated to be reversed for samples of secondary students (Payne, Ellett, Perkins, & Klein, 1975). Past studies have also indicated that higher cohesiveness scores positively correlate with student achievement at the secondary school level. The findings reported here suggest that student perceptions of cohesiveness may differentially relate to the criteria investigated. For these samples of elementary schools, the results suggest that elementary students' perception of high cohesiveness among peers positively relates to school attendance, but negatively relates to school achievement. It may be that cohesiveness is a factor related to the "holding power" of the school, but at the same time, is a general perceptual factor interfering with classroom learning and subsequent achievement. It would be interesting to examine the relationship between high and low cohesive schools (from the student perspective) and subsequent student classroom behavior. Time spent on academic learning activities, for example, might be found to be considerably lower in classrooms perceived by students as high in peer cohesiveness.

Considered collectively, results of the Criterion Variable/MS subscale analyses suggest that elementary student perceptions of academic easiness and

lack of cohesiveness have much in common with higher school achievement, and that perceptions of high cohesiveness and lack of academic difficulty have much in common with school attendance.

Future investigations of teacher and student perceptions and similar school criteria might center on examining the relationships between combinations of teacher and student perceptions and school outcomes. If unique combinations of such perceptions could be repeatedly demonstrated to have criterion-related and predictive validity, much would be learned about important school environment characteristics, and prescriptions for the school context more probably optimizing student learning might be forthcoming.

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